SMITHSONIAN
# zoogoer
For members of **FRIENDS OF THE NATIONAL ZOO**
SEPT | OCT | 2013

# go wild

**Wildlife and science at the Zoo's Front Royal research station**

» A Rainforest in the City
» Knowledge From a Drop of Blood
» Big, Bad, Bird-Eating Tarantulas

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SMITHSONIAN
# Zoogoer

AMY JOHNSON/NZP

SEPT | OCT | 2013 | Vol 42, No 5

## 10 FEATURES


### Go Wild

Virginia's native wild creatures—deer, black bears, bobcats, and more—capture the hearts and minds of scientists, volunteers, and nature lovers at the Zoo's Smithsonian Conservation Biology Institute in Front Royal, Virginia.

BY CRISTINA SANTIESTEVAN

### 16 It's a Jungle in Here

BY OLIVIA REYES-BECERRA

Leave the sounds of the city behind and set out on an exploration into the depths of the Zoo's rainforest.

### 22 River of Life

BY VALERIE MAY

Blood flows in our veins, delivers oxygen throughout our bodies, and carries answers to questions about health, well-being, and more.

SEPT | OCT | 2013

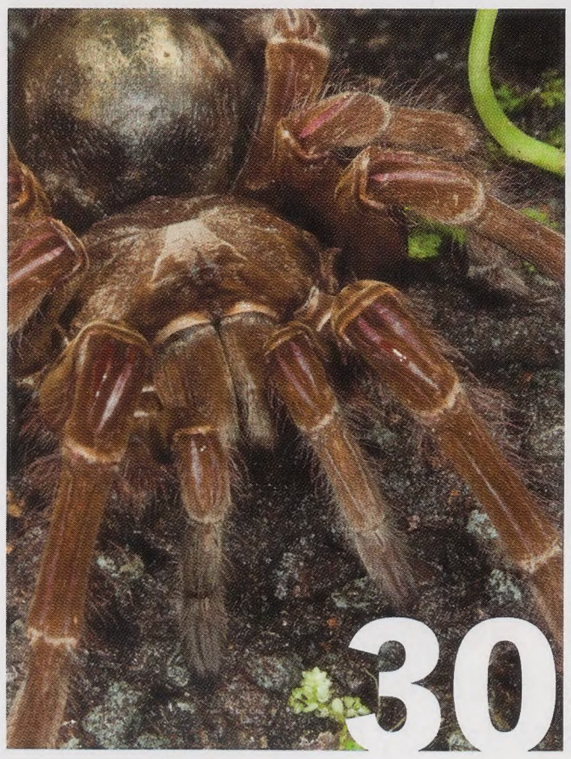
# DEPARTMENTS

7

TAMIE DEWITT

28

JEN ZOON/NZP



30

MEHGAN MURPHY/NZP

36

ABBY WOOD/NZP


**3 From FONZ**
Protecting, preserving, and appreciating wildlife and wild places.

**4 From the Zoo**
We're going to the birds at the Smithsonian's National Zoo.

**5 Zoo News**
Remembering a Zoo visionary, celebrating newly-hatched chicks at the Bird House, a Zoo pizza party, and more.

**28 Kids Corner**
A bird-eating spider, geckos with a clever disguise, hungry vultures, and a peek into daily life with the Zoo's cranes.

**32 FONZ**
Announcing our 2013 FONZ board elections and annual meeting, parties, classes, and fun fall festivals.

**36 Zoo View**
Handsome Hank, the Zoo's youngest sloth bear, shares a smile with a photographer.



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# Zoogoer

FONZ Friends of the National Zoo is the dedicated partner of the Smithsonian's National Zoological Park. FONZ provides exciting and enriching experiences to connect people with wildlife. Together with the Zoo, FONZ is building a society committed to restoring an endangered natural world. Formed in 1958, FONZ was one of the first conservation organizations in the nation's capital.

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**Membership** in FONZ supports the animal care, conservation, and educational work of the Smithsonian's National Zoo. It also offers many benefits: a *Smithsonian Zoogoer* subscription, discounts on shopping and events, discounted or free parking, and invitations to special programs and activities. To join, call 202.633.2922, or visit **fonz.org/join.**

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**On the cover:** White-tailed deer roam the forests near the Front Royal headquarters of the Smithsonian Conservation Biology Institute.
PHOTO BY LISA WARE/NZP

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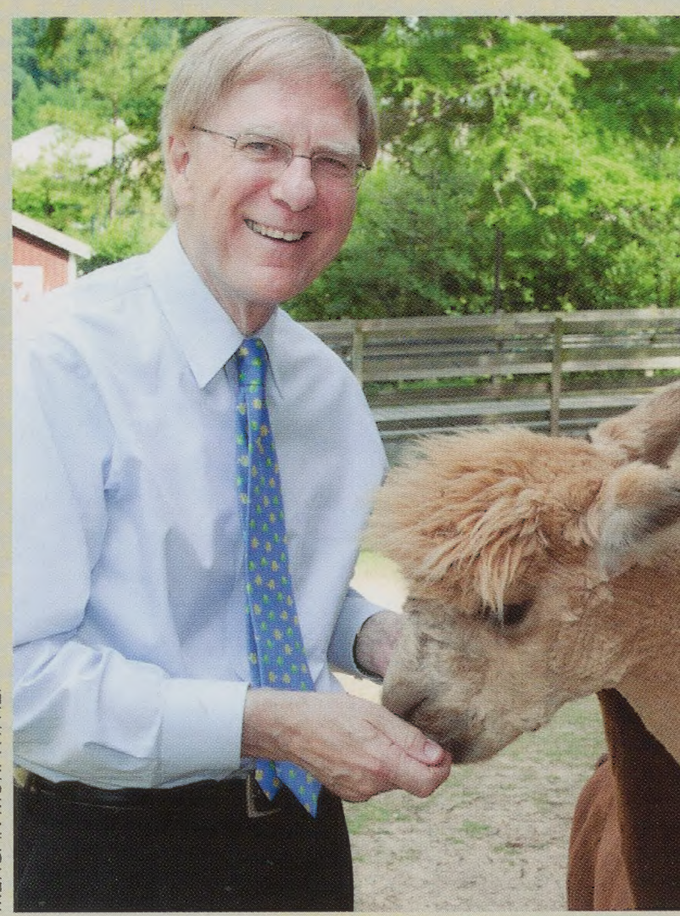
# PAST VISION, PRESENT WORK, FUTURE ANSWERS



MEHGAN MURPHY/NZP

**"THE CLEAREST WAY INTO THE UNIVERSE IS THROUGH A FORESTED WILDERNESS."** Conservationist John Muir wrote those words in his journal during the summer of 1890, while traveling through Alaska. In my opinion, he was absolutely right.

I suspect anyone who has spent time exploring the natural world has felt the same way from time to time. There are answers to be found among the leaves and shadows of a forest. Some may link to the broader universe. Others are more literal: answers to questions of a species' survival, a forest's succession, or a climate's change.

Answers also hide in the forests embracing our Front Royal campus, headquarters of the Smithsonian Conservation Biology Institute (SCBI) where a growing team of scientists, volunteers, and students are hard at work. Their questions are varied: How can the development of natural resources be balanced with the need to protect species? How can range managers in developing countries best utilize modern technology? How do we balance feeding a growing world population while sustaining wildlife? These questions—and many more—are being addressed, one project at a time. (See "Go Wild" on page 10 to learn more.)

We owe the existence of SCBI Front Royal to the vision of the late Dr. Ted Reed, past director of the Smithsonian's National Zoo, and the vigilance of the FONZ board. During his tenure as Zoo director (1956-1984), Reed was alerted by FONZ leaders to the existence of a 3,200-acre parcel of federal land that was about to be sold. With the aid of the FONZ board and the support of Smithsonian leaders, the Zoo acquired the property in 1974. Today, the facility has added new buildings and projects, and bears the name of SCBI, but its overall mission remains essentially unchanged: to conduct and support the research needed to save species.

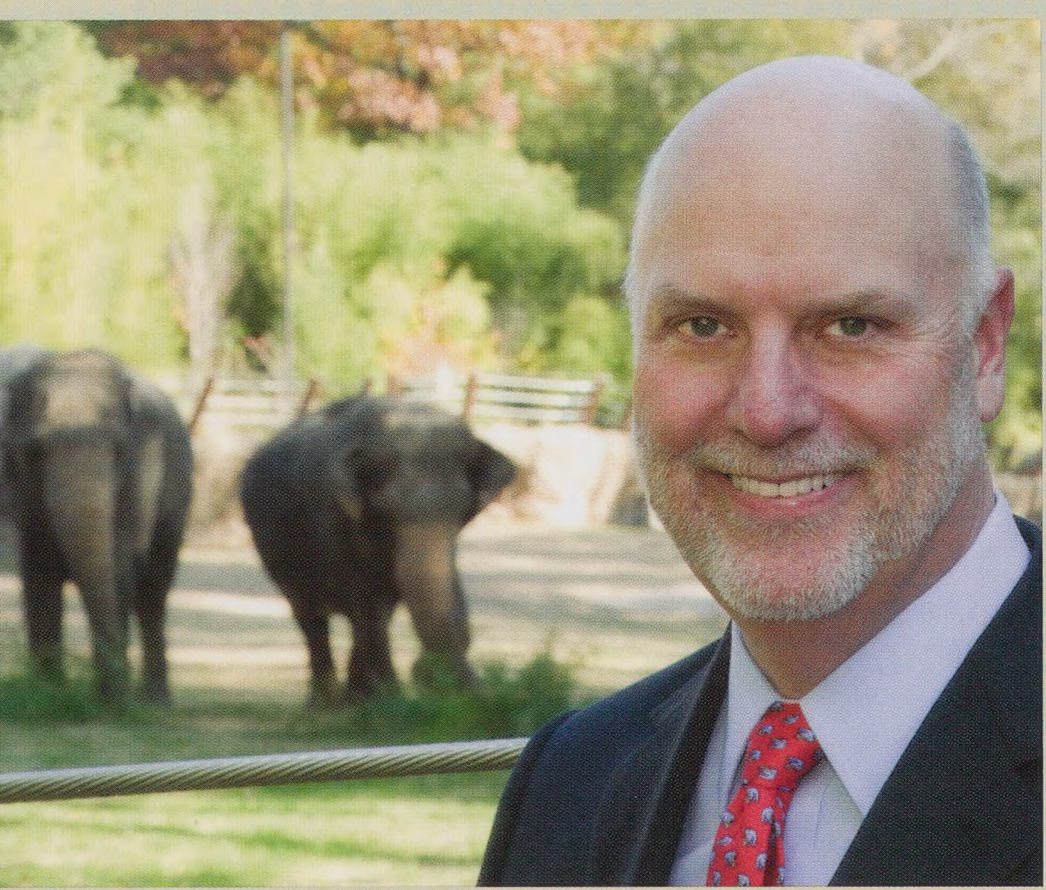
Although we lost Dr. Reed recently, his legacy lives on in Front Royal. I hope you will join us there for our annual Autumn Conservation Festival on October 5-6. Front Royal is normally closed to the public so that the staff can focus on their important work. But for these two days, we invite you to visit, speak with our scientists, and explore the gorgeous landscape that Dr. Reed and his partners helped secure. You may just encounter the universe there.

Sincerely,

Bob Lamb

Bob Lamb
Executive Director, Friends of the National Zoo

# VISITORS FROM AFAR



MEHGAN MURPHY/NZP

**THE SCOUTS ARRIVED ON MARCH 12.** They were the vanguard. The first of a migrating flock of birds that would arrive in full force by late March to build their nests in the trees surrounding the Bird House at the Smithsonian's National Zoo.

These birds are black-crowned night-herons, and our records suggest that this colony has been nesting here for many years. In total, several hundred birds nest here during an average summer. They wander freely and mingle with our animals in open-air exhibits. We consider them such a part of our Zoo family that our keepers feed them daily at 2 p.m. The black-crowned night-herons generally migrate south sometime in September, and I hope you will stop by to visit the herons and watch a feeding demonstration before they depart for the year.

Where do they go when they leave every fall? That's something we don't yet know. With the help of satellite-tracking technology, we hope to begin to answer this question soon. In fact, by the time you read this letter, we may have already begun tagging herons so that we can track their migration southward.

Eventually, we hope to share whatever data we collect through this project with you—FONZ members, teachers, students, and anyone who is curious. And when we create a set of new, world-class exhibits on the site of our current Bird House—our next big planned exhibit project—this story of migration will be a central theme. Because, in order to really save migratory species, we must protect all the habitats they rely upon. A better understanding of migration will help us do that.

Studying night-heron migration is, of course, just one example of Zoo science. I hope you will join us the weekend of October 5-6 for our annual Autumn Conservation Festival at the Smithsonian Conservation Biology Institute in Front Royal to learn more. You will have the opportunity to meet our scientists, ask questions about their research, and discover something new about the animals that share our planet.

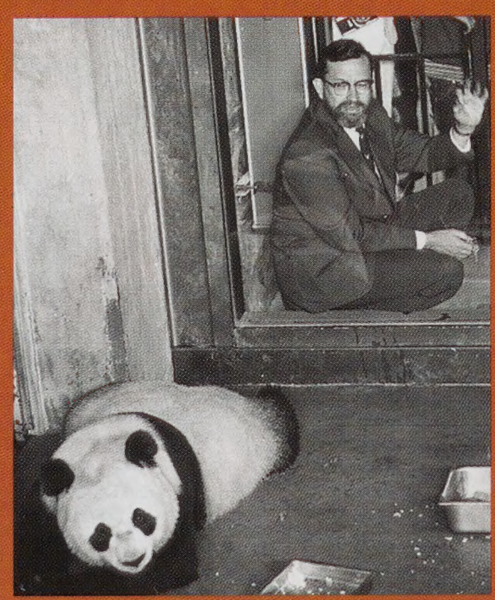
I hope to see you soon, at the Bird House, the Autumn Conservation Festival, or both.

Sincerely,

Dennis Kelly

Dennis Kelly
Director, Smithsonian's National Zoological Park

# Remembering **Ted Reed**



Former director of the Smithsonian's National Zoo, Theodore Reed, DVM, passed away July 2, 2013, in Milford, Delaware. He was 90 years old.

A native of Washington, D.C., Reed studied veterinary medicine at Kansas State College, and then worked as a veterinarian in Oregon and Idaho before returning to D.C., where Reed joined the Zoo in 1955 as the veterinarian on staff. He then accepted a role as the Zoo's acting director in 1956, and became director in 1958. Reed served as Zoo director until 1984, when he retired from that position to serve as a senior scientist and veterinarian emeritus at the Zoo.

During his tenure, Reed oversaw the acquisition of the old Remount Depot in Front Royal, and launched the Conservation and Research Center that has now become the Smithsonian Conservation Biology Institute. The center's mission has evolved over the years, but its focus remains true to Reed's original concept: a center for conservation-related activities across the Smithsonian.

As a member of the Association of Zoos and Aquariums, Reed served numerous roles and was ultimately awarded the AZA's highest honor—the R. Marlin Perkins Award—in 1984.

Ted Reed will be missed, but his legacy lives on at the Zoo and in Front Royal, where Zoo staff continue to be leaders in the conservation of threatened and endangered species.

# WHOOOO'S NEW?

**June 4 brought a new addition to the Zoo's Bird House with the hatching of a burrowing owl chick. Burrowing owls are the smallest of North America's owls, and the only owl species that nests exclusively underground. The birds are found in grasslands and other open habitats, where they often build their nests and raise their chicks in abandoned prairie dog and ground squirrel tunnels. Stop by the Bird House in the mornings for the best chance of seeing the Zoo's youngest burrowing owl.**

## Pizza Playground Reopens

After nearly a decade of playtime, the Zoo's popular Pizza Playground needed an update. Now, thanks to generous donations from Ledo Pizza® and FONZ members, the playground has reopened with a new design, updated exhibit elements, and the return of larger-than-life olives and tomatoes that kids can climb. The Pizza Garden—featuring popular pizza ingredients—continues to give parents and children a taste of conservation and sustainability. Zoo visitors, staff, and volunteers celebrated the reopening of the Pizza Playground with a pizza party on June 29.

The Pizza Playground, sponsored by Ledo Pizza®, is adjacent to the Kids' Farm, and is open to children and families of all ages.

JIM JENKINS

TAMIE DEWITT

## More Than a Pretty Flower

Horticulturists, keepers, and volunteers collaborated to plant new plants, install a small pond, and build a trellis for the Zoo's Butterfly Garden this spring. Now, the work is complete, the trellis supports a beautiful passion flower vine, and the garden has been certified as a Monarch Waystation by Monarch Watch. The newly replanted garden provides food and shelter for native pollinators, including butterflies, moths, and bees. The Butterfly Garden is located behind the Invertebrate Exhibit and Pollinarium.

CLYDE NISHIMURA/NZP

Ledo Pizza® president, Jamie Beall, officially opens the new Pizza Playground.

JIM JENKINS

JANICE SVEDA

## Clouded Leopard Cubs Depart for Tennessee

Front Royal keepers and staff bade a fond farewell to Mingma and his sister, Kali, on June 20, when the two clouded leopard cubs departed Front Royal for their new home at the Nashville Zoo. The cubs were born on February 6 and had been hand-raised by keepers and staff at the Front Royal facility. At Nashville, the young clouded leopards will be paired with their future mates even though they are still too young to breed. Pairing clouded leopards early drastically reduces the risk of aggression between these endangered cats when they reach sexual maturity.

Clouded leopards are listed as vulnerable to extinction in the wild. The Zoo's Front Royal facility has celebrated the births of more than 70 clouded leopards over the past 30 years and is a leader in conservation science initiatives to save the species.

## 53 and Counting

Since 1997, the Zoo has been a leader in the care and breeding of kori bustards, an African bird that looks a bit like an oversized greater roadrunner. Now, staff and volunteers are celebrating the successful hatching of the Zoo's 53rd kori bustard chick, which hatched June 4. The chick is expected to be on view in the Bird House by September.

CONNOR MALLON/NZP

## Mark Your Calendar

Sept. 6 **Rock-N-Roar**—Get ready to rock with Marc Roberge and Richard On of O.A.R. at the Smithsonian's National Zoo. **Fonz.org/rocknroar**

Sept. 7 **Sloth Day**—Turn your world upside down at the National Zoo's Sloth Day event. Visit the Small Mammal House during this fun family-friendly event to learn all about sloths and their habitats. FREE.

Sept. 22 **Asian Elephant Day**—Trumpet your love for all things pachyderm with this celebration of our Asian elephants. Event includes talks by our elephant staff and scientists, animal demonstrations, and more. Located at the Elephant Community Center. FREE.

Sept. 29 **Fiesta Musical**—Celebrate Hispanic Heritage Month at the Zoo's fiesta. FREE. **Fonz.org/fiesta**

Oct. 5-6 **Autumn Conservation Festival**—The one time every year that SCBI Front Royal is open to the public! Come get a behind-the-scenes look at our world-renowned science, research, and animal care. **Fonz.org/acf**

Oct. 12 **Celebrate Cats Day**—Learn more about the Zoo's feisty felines through this family-friendly event, which includes educational activities, keeper talks, and live animal demonstrations. Located at Lion/Tiger Hill. FREE.

Oct. 25-27 **Boo at the Zoo**—Come to the Zoo for the wildest trick-or-treat experience in town. Enjoy animal encounters, keeper talks, and more. **Fonz.org/boo**

Oct. 30 **Night of the Living Zoo**—Join us for our adult Halloween event, if you dare. **Fonz.org/nolz**

# TRICK OR TREAT WITH THE BEARS

## 15TH ANNUAL BOO AT THE ZOO
## OCTOBER 25, 26 & 27, 2013
## 5:30-8:30PM

$20 FONZ members; $30 nonmembers

With more than 40 treat stations, animal encounters, and decorated walkways, this safe and spooky event at the Smithsonian's National Zoo is fun for the whole family. Proceeds benefit animal care, education, conservation science, and sustainability programs at the Zoo. Get tickets at **fonz.org/boo.htm**, any Ticketmaster outlet, or National Zoo Store.

*Tickets purchased at the National Zoo have no added fees.*

Boo at the Zoo is generously sponsored by: BIG 100.3, California Tortilla, The Coca-Cola Company, Comcast, FedEx and Safe Kids USA, HBP, hibu, HOT 99.5, Mars, Incorporated, 97.1 WASH-FM, *Washington Parent*, Whole Foods Market, 98.7 WMZQ

Boo at the Zoo

"I think most people don't realize some of the fun things we have living here," says Lisa Ware, senior veterinary technician at the Zoo's Front Royal campus and self-described backyard naturalist. "It's funny. People will say to me, 'Oh wow! You work with cheetahs!' And, I'll reply, 'Yeah, they're really cool. But did you know we have bobcats?!'"

## Local, Wild, and Fascinating

Beyond the cheetahs' yards, behind the veterinary building, and everywhere in the hills and valleys that define its campus, the Front Royal headquarters of the Smithsonian Conservation Biology Institute (SCBI) teems with native wildlife. Black bears trek through the forests, bobcats and red foxes prowl around the buildings, and native birds occasionally build nests in the same fields and open-air enclosures where white-naped cranes, Przewalski's horses, and maned wolves live. Kingfishers, long-eared owls, otters, and coyotes have all been spotted on or near campus.

And that's exactly how SCBI staff, researchers, volunteers, and students want it. Studying native species in their own backyard increases our understanding of local and global conservation challenges. But it hasn't always been this way.

"I have been here since '86," says SCBI research ecologist Bill McShea. "When I came here this was primarily a breeding center for endangered species." A lot has changed in the 27 years since then. While the breeding of endangered species remains an important focus at SCBI's Front Royal headquarters, the center's scope has expanded to incorporate ecological research and conservation projects dedicated to both local and global species. What was once considered an added bonus to the captive breeding programs has grown into a collection of long-term research projects with multiple teams of staff researchers, volunteers, and student contributors.

**An hour west of Washington, D.C., snug up against Shenandoah National Park, sit 3,200 acres of Zoo land where many of the creatures run wild and free.**

# go wild

BY CRISTINA SANTIESTEVAN

LISA WARE/NZP

# go Wild

Today, the SCBI Front Royal research projects devoted to local wildlife are as varied and fascinating as the animals, plants, and landscapes they seek to understand.

## Recording Change

In May 2008, McShea, research associate Norm Bourg, and a team of researchers took to the woods with measuring tapes. Their goal: to measure, identify, and record every single tree, shrub, or woody vine with a diameter greater than one centimeter at chest height (1.4 meters off the ground) on a 25.6-hectare (63.3-acre) plot of forested land within the Front Royal campus. This plot of land—the SCBI Forest Dynamics Plot—is part of a global project known as Smithsonian Institution Global Earth Observatories (SIGEO). The project seeks to learn more about forest diversity, carbon storage, ecosystem dynamics, and the response of forested ecosystems to climate change.

"We are in the process of recounting all those stems," says McShea, who explains that the process can take a while. "Every stem has to be remeasured, and all the new ones have to be identified and put into the system." The detailed information that McShea and his team collect will further our understanding of how forests in temperate regions compare to forests elsewhere in the world, from the tropics to Canada and the Czech Republic.

The SCBI Forest Dynamics Plot is also the site for numerous other studies, explains McShea. "We have such detailed information about the plot, and we can easily build another project on top of that." These add-on projects include soil analyses, tick sampling, and invasive species studies. Elsewhere—at SCBI's Front Royal headquarters and throughout the surrounding forests and fields—biologists census wood turtles and amphibians, use radio collars to track deer, and employ motion-sensing trail cameras to record wildlife movements through a program called eMammal.

Taken together, the answers these projects provide may ultimately help land managers and wildlife biologists better understand and manage diseases that impact humans and wildlife, invasive species, habitat loss, the risk of extinction, and more. "Conservation doesn't only happen in Namibia and Uganda and China," says McShea. "Conservation happens right here at home. When we're talking about endangered species or loss of species, we can honestly say it is happening here too."

## Birds and Bees and Farmers' Fields

Tucked behind a handful of buildings, 116 small condos hang a couple dozen feet above the ground. Their occupants are the breeding pairs and current nestlings of the resident colony of purple martins, which has been nesting here for nearly 20 years. "They are not endangered," explains Sue Garvin, a FONZ educator who manages the purple martin colony. "But east of the Mississippi, purple martins are entirely dependent upon human-provided housing. They no longer nest naturally. This started long ago. When the first European settlers arrived here, they discovered that Native Americans were hanging hollowed gourds for the martins to nest in."

No one knows exactly why purple martins stopped nesting in natural cavities, but the birds now require human support throughout their eastern range. "If you don't maintain your purple martin colony, that colony will collapse," says Garvin, who explains that mite infestations, aggressive European starlings, and unchecked predators can all cause these birds to abandon a colony.

**Go Wild!** SCBI offers several opportunities for citizen scientists to participate with local projects:

- Virginia Working Landscapes: **vaworkinglandscapes.org**
- eMammal: **facebook.com/eMammal**
- Front Royal bird projects: **fonz.org/volunteer**

A team of FONZ volunteers helps Garvin manage the purple martin colony as well as the 30-year-old bluebird trail on SCBI's Front Royal campus. In addition to maintaining clean nest sites, the team assists with banding nestlings, recording data, and tracking nesting successes over the years. Ultimately, this information may guide future decisions about nest types or maintenance routines for purple martins at SCBI's Front Royal headquarters and elsewhere.

Beyond the campus, volunteers, landowners, SCBI researchers, and local partners are joining forces through another citizen-science supported program: Virginia Working Landscapes. The project aims to increase the sustainable use of agricultural land in the region, effectively finding ways to manage working land so that wildlife and agriculture can coexist. Participating landowners work with Piedmont Environmental Council, Virginia Tech, and other local partners to improve the biodiversity on their property by planting native grasses and other plants, shifting the time frame of their hay harvest, restoring natural habitats, and more.

"Conservation needs to start at the root of the problem, within the landscapes where these species live," says Amy Johnson, Smithsonian-Mason Ph.D. fellow and SCBI coordinator for Virginia

AMY JOHNSON/NZP

LISA WARE/NZP

AMY JOHNSON/NZP

LEFT: **Virginia Working Landscapes offers guidance and support to local landowners who seek to balance the needs of agriculture with wildlife;** TOP: **Red-winged blackbirds build their nests in open fields, meadows, and marshes;** BOTTOM: **Two young chickadees beg for a meal.**

LISA WARE/NZP

# WHERE THE WILD THINGS ARE

Opportunities abound for those who are curious enough to seek out native wildlife in and around Washington, D.C.

## At the Zoo

Founded in 1889 as a refuge for threatened North American wildlife, the Zoo showcases many of the continent's wild treasures.

- American Trail is home to common and uncommon native species, from ravens and beavers to bald eagles and gray wolves. Stroll the trail, meet the animals, and linger for a keeper talk to learn more about our wild neighbors.
- Stop by Lion/Tiger Hill to visit with a less familiar but more local feline: the bobcat. This spotted, bob-tailed cat is native to many parts of the United States, including nearby Shenandoah National Park.
- Copperheads and timber rattlesnakes are the only two vemonous snakes native to the wilds near Washington, D.C. Both can be seen in the Reptile Discovery Center.
- The Reptile Discovery Center is also home to several species of local amphibians—frogs, salamanders, and newts—including the hellbender, North America's largest salamander.
- Black-footed ferrets are not native to the region near D.C., but they are a North American species that's made an amazing comeback with the Zoo's help. Stop by the Small Mammal House to see them.

## In Front Royal

The Zoo's Front Royal research and conservation center is usually closed to the public. But for two days every October, SCBI scientists, staff, and volunteers open their doors and invite anyone who is curious to come visit, explore, and learn about the many animals and research projects found at the facility. The 2013 Autumn Conservation Festival will be held October 5-6, with more species on view than ever before. Learn more at **fonz.org/acf**.

## Beyond the District

Prefer to see your wildlife in the wild? If you live in or near D.C., you might want to visit one of these local destinations:

- Assateague Island National Seashore, MD and VA
- Blackwater National Wildlife Refuge, MD
- Eastern Neck National Wildlife Refuge, MD
- Shenandoah National Park, VA
- Sky Meadows State Park, VA

## With a Group

Countless groups—local, regional, and national—organize outings, classes, and events to celebrate native wildlife and plants:

- Most states have a native plant society. Local readers may be interested in the Virginia Native Plant Society (**vnps.org**) or Maryland Native Plant Society (**mdflora.org**).
- Many states—including Maryland and Virginia—offer master naturalist programs.
- The National Audubon Society organizes local chapters throughout the United States (**audubon.org/chapters**).
- Many national parks, state parks, and natural areas offer group opportunities for exploration and education.

Working Landscapes. Johnson explains that the premise behind the program is simple: Restore native habitats, and the native species will return.

Implementation, of course, is more complex. Individual restoration plans must be established for each property, and farmers may need to settle for reduced agricultural productivity if they also want to manage for wildlife. "A good hayfield is not necessarily a good wildlife field," says McShea, who explains that native birds, pollinators, and other wild species generally do not eat the grasses that most farmers prefer to grow for cattle. "Everything a farmer would call a weed is what a pollinator would call a flower."

Despite the potential for a reduced harvest, numerous farmers and landowners have already joined the Virginia Working Landscapes program, which currently has a waiting list. Participants receive guidance from program partners, and then implement those suggested changes on their properties. In return, Virginia Working Landscapes provides a series of biodiversity surveys—counting birds, pollinators, and native plants—that allow landowners to track the return of wildlife to their properties. "Some landowners will even get up at 5:30 in the morning to join me for bird surveys in their fields," says Johnson. "They truly get excited. It's really, really fun."

## Wild for Wildlife

By researching the native wildlife living on and near SCBI's Front Royal headquarters, biologists find answers to important questions about species distribution, ecosystem dynamics, climate change, and more. But as Ware and others will explain, there's another reason to look for local wildlife: It's fun.

"I love the mystery and elusiveness of our native animals," says Ware, who spends much of her off time wandering the woods on and around SCBI's Front Royal campus. Over the years, Ware has come face-to-face with a young bobcat, watched kingfishers dig 39-inch-deep nesting burrows into stream banks, and captured photographs of belly-flopping bears. "These amazing animals are right under our noses, we just need to look for them."

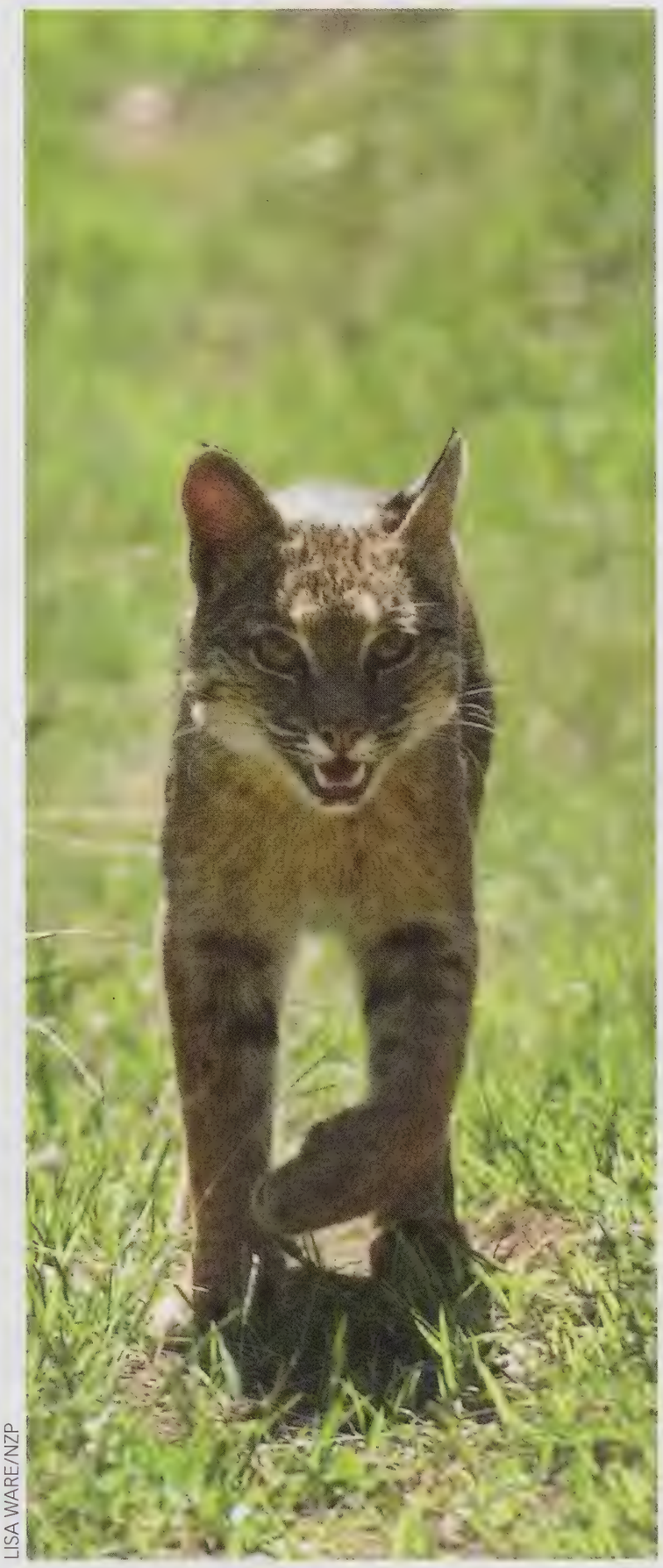
Ware insists there is no special trick to seeing native wildlife. "Go to Shenandoah National Park and drive Skyline Drive. I've seen bobcats, bears, and deer from my car. Or take a nice quiet walk on a nature trail in the early morning or late evening. You have to be a little observant to see some of the good stuff. But it's right there."

"Everything we're talking about is right here," agrees McShea, who encourages people to explore the world around them, from their backyards to the country's national parks. "You want to see black bears? Go up in Shenandoah National Park and spend some time there. You won't see one in 15 minutes. But if you go spend a weekend up there, you'll see a black bear."

Many visitors think of the Zoo as a place to see exotic animals. And it is. Yet McShea, Ware, Garvin, Johnson, and their Front Royal colleagues embody another key part of the Zoo's mission, one as old as the park itself: championing the wonder and value of North America's own amazing animals. SZ

— *Freelance writer-photographer* CRISTINA SANTIESTEVAN *is a contributing editor to* Smithsonian Zoogoer.

LISA WARE/NZP

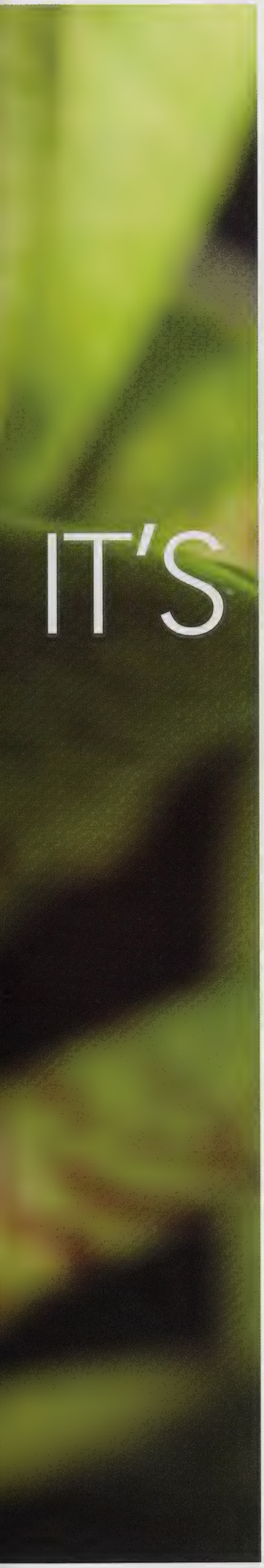


LISA WARE/NZP

TOP: **A green frog sings to attract a mate;** BELOW: **Observant drivers and hikers may see bobcats in and around Shenandoah National Park;** FACING PAGE: **Four young red foxes survey their surroundings.**

**Visit SCBI's Front Royal headquarters at our annual Autumn Conservation Festival, October 5-6. fonz.org/acf**

For 21 years, the Zoo's Amazonia exhibit has drawn visitors into one of the richest and most threatened ecosystems on Earth.



# IT'S A JUNGLE IN HERE

**BY OLIVIA REYES-BECERRA**

*Light peeks through a forested canopy. Water rushes. Insects murmur. Monkeys cavort. Vines dangle. Large fish glide through clear pools.*

MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP

Those aren't the sights or sounds one expects to find in the heart of Washington, D.C., though the humid air embracing them might feel familiar. Yet these wild wonders are here if one knows where to look—in the Amazonia exhibit at the Smithsonian's National Zoo.

Home to nearly 400 species of plants and animals, the multilevel exhibit includes a 15,000-square-foot rainforest and several massive aquariums. At its 1992 debut, Amazonia was the largest and most ambitious exhibit the Zoo had ever attempted. Now, 21 years later, it remains among the most popular.

MEHGAN MURPHY/NZP

LEFT: **Fond of fruit and berries, the blue-gray tanager plays a key role in dispersing seeds for tropical trees and shrubs.**
BELOW: **Vibrantly green during the day, the lemur frog turns reddish brown at night.**
FACING PAGE, CLOCKWISE FROM TOP LEFT: **Cocoa tree, avocado tree, sandbox tree leaves, artificial kapok tree.**

MEHGAN MURPHY/NZP

## INTO AMAZONIA

**Experienced Zoo visitors recommend getting to the exhibit early to beat crowds. Others suggest walking slowly through the habitat. But the best-kept secret of Amazonia is to look up! Life teems in the treetops; you don't want to miss it.**

**Here are just a few of the things you might see:**

- **Arapaima**
- **Banded leporinus**
- **Blue-gray tanager**
- **Freshwater stingray**
- **Goeldi's monkey**
- **Twig catfish**
- **Rose hair tarantula**
- **Silver-beaked tanager**

MEHGAN MURPHY/NZP

### Amazonian Inventory

Year in and year out, visitors at Amazonia have been greeted by a true character: the fictitious Dr. Brasil, whose journal entries and drawings shed light on the rainforest ecosystem and scientific fieldwork. The good doctor is ably assisted by staff and volunteers who wander the exhibit, answering questions and helping visitors spot tricky-to-see rainforest residents.

Animals, you see, roam free in the Zoo's rainforest. Many of them have lived here since the exhibit opened. These creatures include Goeldi's monkeys leaping from tree to vine; tropical birds winging overhead; and a variety of fish swimming through the waters below.

The animals' tropical world recreates one of the most biodiverse ecosystems on the planet. As Dr. Brasil observes in his journal, "I once tried to count the different species on a single tree, and it turned into a project of weeks."

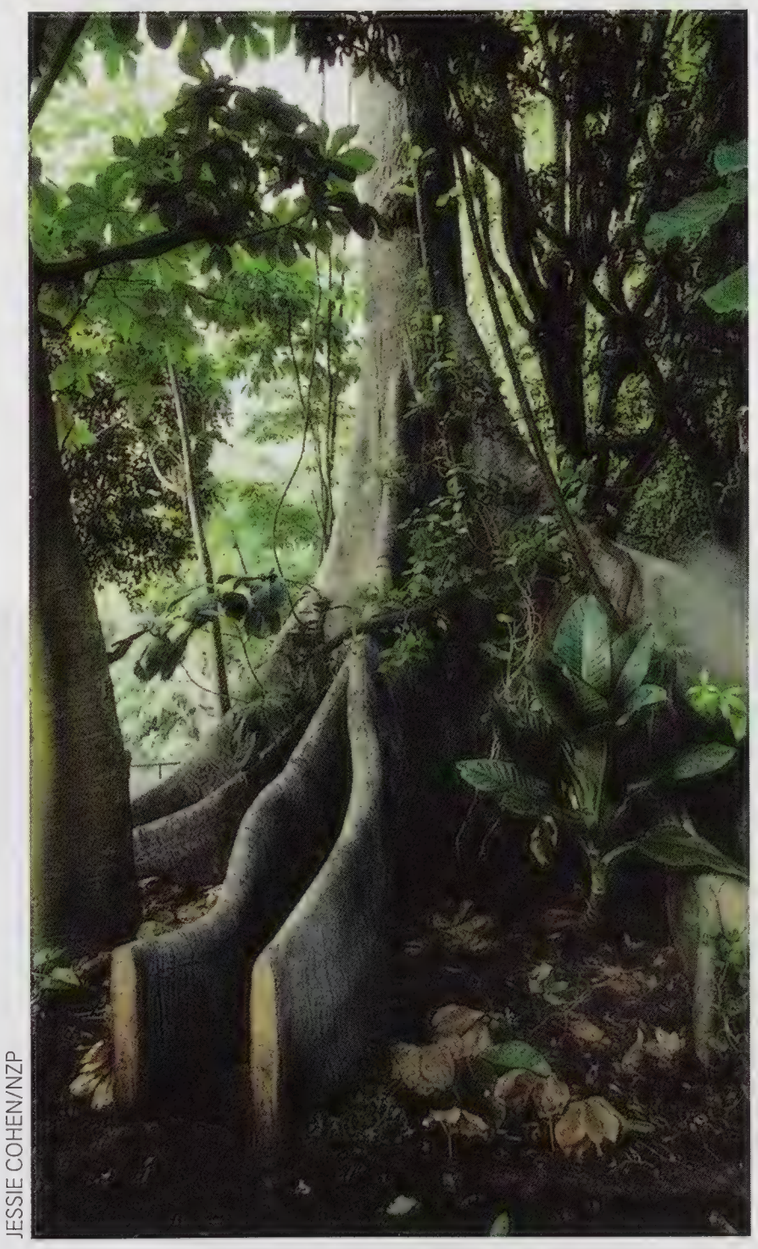
Counting the types of trees within Amazonia might take even longer. Much of the flora here represents species that benefit humankind in varied ways. Avocado trees yield the most protein-rich of

JESSIE COHEN/NZP

JESSIE COHEN/NZP

all fruits. Guava trees and papaya bushes also delight human palates, as do cashew trees, whose prized treats come wrapped in juicy fruit coated with poison. Cocoa trees, vanilla orchids, and sweet potato vines provide much-loved culinary treats. And the chicle tree's sticky sap was once the main ingredient in chewing gum.

Other trees offer nonculinary products. The fiber-filled seed pods of the towering kapok tree are harvested for their long, stiff threads which are used in life preservers and pillows, and as surgical stitches. Balsa is the world's lightest wood, which makes it handy for constructing models. And the seeds of the achiote tree provide the annatto coloring that helps make lipstick red. Then there's the majestic mahogany, whose prized hardwood is synonymous with fine furniture—placing the species' survival in peril from over-harvesting.


JESSIE COHEN/NZP

JESSIE COHEN/NZP

## Water Wonders

As you explore Amazonia's rainforest, be sure to look down now and then to glimpse the vast aquarium below. Or get an underwater view by heading downstairs to the Flooded Forest section. There you'll see a variety of Amazonian fish, including multiple catfish and tetra species.

One of the biggest and most striking inhabitants of the aquarium is the arapaima, a fish that can grow nine feet long and weigh several hundred pounds. Its prehistoric looks befit an animal that has swum the rivers of South America for five million years.

Not far from the giant tank, another aquarium hosts freshwater stingrays. They represent one of the Zoo's great reproductive triumphs. Four stingrays, the Zoo's first, came to Amazonia in 2001. Since then, 28 pups have been born here. The Zoo donated some to aquariums in Tennessee and South Carolina.

## Endangered Ecosystem

You won't want to leave Amazonia until you've visited the Science Gallery. Its interactive exhibits highlight much of the rainforest-related science going on behind the scenes at the Zoo and in the field.

One of the gallery's highlights is Amphibian Alert, an exhibit that is part of an international campaign to raise awareness of the plight of amphibians, many of whose populations are crashing. A key culprit in the decline is the lethal and fast-spreading chytrid fungus, which threatens at least a third of all amphibian species.

"Time is of the essence," says Zoo scientist Brian Gratwicke. "We need to save these important creatures for their direct cultural, biomedical, and ecological impact on human lives." Gratwicke serves as international coordinator of the Panama Amphibian Rescue and Conservation Project (PARC), a collaboration among eight institutions, including the Zoo and the Smithsonian Tropical Research Institute. Among PARC's undertakings are the creation of captive breeding colonies of endangered amphibians and the pursuit of a cure for chytrid.

Amphibian Alert also offers visitors a chance to see some of the world's most impressive and imperiled frogs. They include the critically endangered Panamanian golden frog (actually a toad), which has not been seen in the wild since 2008. The Zoo

has emerged as one of the global leaders in housing and breeding this iconic amphibian—often described as Panama's equivalent of the bald eagle.

Amphibians, of course, are far from the only endangered animals in the Amazonian ecosystem. A key threat is habitat loss as people raze trees to harvest timber and create space for farms and ranches. In the past four decades, nearly 20 percent of the Amazon rainforest has been clear-cut. Educating visitors about threats to this irreplaceable ecosystem has been a core part of Amazonia's mission from day one, says curator Vincent Rico.

## Going Green

The Amazonia exhibit practices what it preaches. Eight years ago, the rainforest was overhauled, in part to make the exhibit more eco-friendly. One wall, for instance, was originally covered in sphagnum, a type of thick moss. It was later discovered that using sphagnum that way was not environmentally sustainable. So it was replaced with sustainable coconut coir.

The roof was replaced at the same time. This new roof allows far more sunlight to stream into the exhibit, reducing both energy costs and the exhibit's carbon footprint. A special fiberglass panel protects the tops of the trees from the plant equivalent of sunburn. The National Zoo was one of the first zoos to install this type of roof for an exhibit.

MEHGAN MURPHY/NZP

Since the Amazonia renovation, eco-friendly construction has been a hallmark of new Zoo projects, including Asia Trail, American Trail, and Elephant Trails.

Renovation aside, the Amazonia team tries to allow the rainforest to mature as naturally as possible. But in this human-crafted setting, Mother Nature sometimes needs a bit of help. Staff rigorously monitor humidity as well as the quality of both air and water. They also keep a sharp eye out for any contaminants lurking on

LEFT: **Curator Vince Rico describes Amazonia as a one-of-a-kind opportunity to work with animals, plants, and staff.**
BELOW: **Keeper Jaime Ramsay feeds freshwater stingrays.**

MEHGAN MURPHY/NZP

plants or rocks. They literally weed out invasive vegetation and prune the treetops.

### Talented Team

Despite changes, the Amazonia exhibit has benefited from the key constants of veteran leadership. Exhibit curator, Vince Rico, has been with the exhibit since before it opened. One of his great joys has been watching tiny fish grow to be several feet long. Rico's team, he notes proudly, is a "great group of people who are interested and motivated."

Two stalwarts of that team are museum specialist Ed Smith and keeper Justin Graves. Smith has worked at the Zoo for more than 25 years, while Graves has been here for 16. Together, they have produced what Rico describes as "dynamite research." Graves also coordinates the keeper aide and horticulture sections of Amazonia's volunteer program.

Volunteers, truly part of the team, assist with food preparation, record-keeping, and behavioral observations. In fact, Graves points out that Amazonia volunteers "perform most of the duties of an animal keeper." When Amazonia opened, it hosted three or four volunteers a week. Now the exhibit welcomes four to five each day.

These volunteers help visitors explore the exhibit and learn about the animals, plants, and conservation issues. A few of these volunteers are now Zoo employees, while a few others have gone on to work at the National Aquarium and the National Institutes of Health.

### The Road Ahead

On its journey to adulthood, the Amazonia exhibit, Rico notes, has "stood the test of time." It entertains and educates many visitors every year and has witnessed triumphs in animal breeding and research. So what's next?

Rico and his team plan to keep doing what has worked so well: taking vigilant care of both flora and fauna, educating visitors about the wonders of the Amazonian ecosystem, and inspiring interest in conservation. The most important thing the exhibit can do, Rico says, is to help zoogoers "appreciate the diversity of Earth and do our part to protect it." SZ

— OLIVIA REYES-BECERRA *is an intern for Friends of the National Zoo.*

PAM JENKINS

RIGHT: **Goeldi's monkeys are omnivores, feasting on fruit, insects, and small vertebrates.** BELOW: **Able to grow nine feet long, the arapaima is one of Earth's largest freshwater fish.** BOTTOM LEFT: **Freshwater stingrays are native to the rivers of South America.**

**DID YOU KNOW?**

**Unlike most other fish, arapaima can breathe air. They often live in shallow water and surface regularly to catch a breath. If need be, though, they can also use their gills to breathe underwater.**

JESSIE COHEN/NZP

ABBY WOOD/NZP

CONNOR MALLON/NZP

# RIVER OF life

BY VALERIE MAY

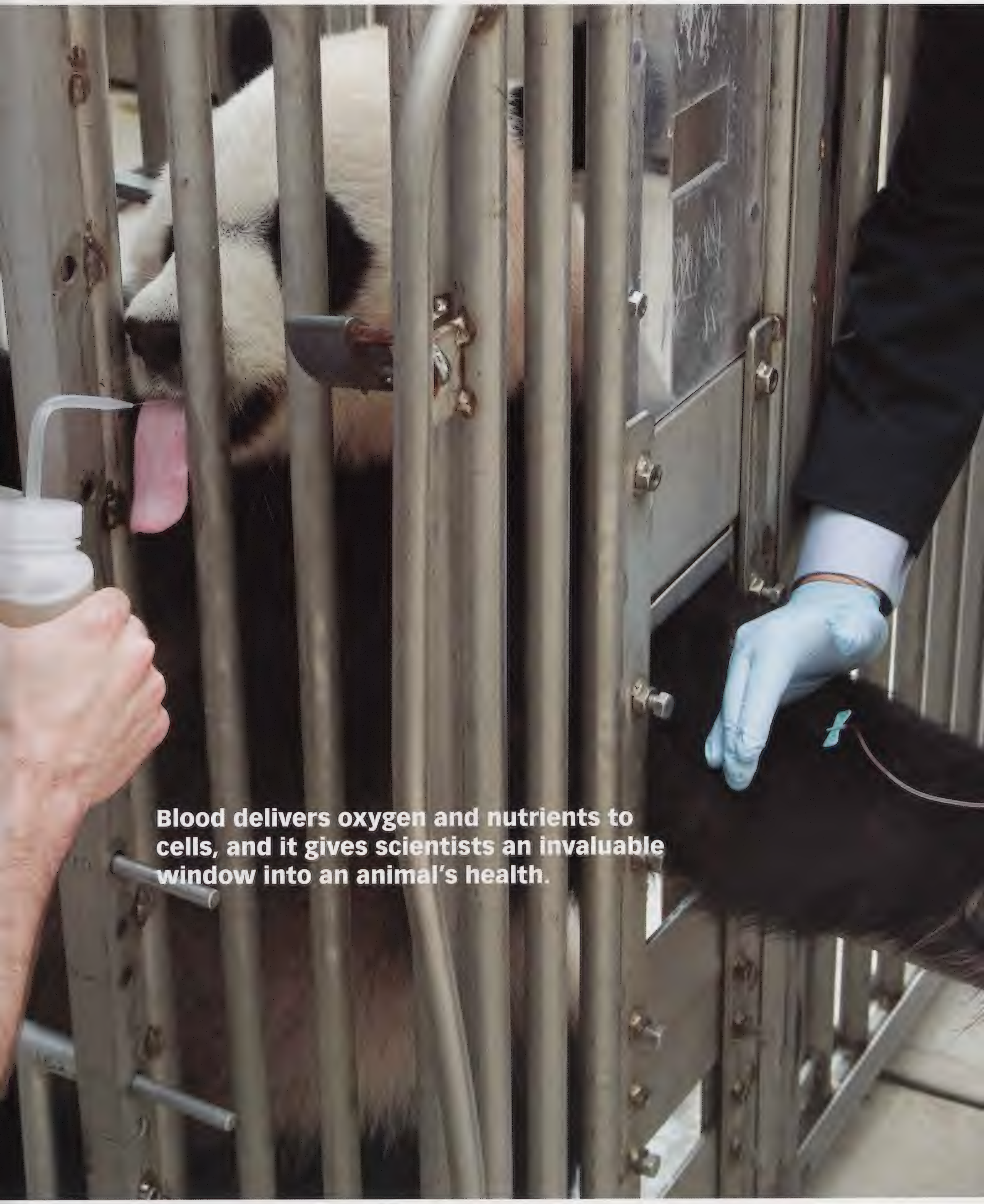
**"I love everything that flows,"** wrote novelist Henry Miller. His earthy examples included a substance so literally vital that many creatures couldn't survive without it—blood. Ferrying oxygen and nutrients throughout the body, blood truly is, as it's been described, a river of life.

At the Smithsonian's National Zoo, that river flows through the work of animal care staff and scientists. Careful coaching has trained some animals to cooperate with blood draws. Blood analysis helps scientists explore such disparate topics as the impact of climate change on salamanders and the best treatment for an ailing elephant. And a bank of blood samples aids researchers around the world.

## Blood Basics

So what exactly is blood? For vertebrates, which include mammals, reptiles, birds, fish, and amphibians, blood is a mixture of plasma and cells. Plasma is a pale yellow liquid composed mostly of water and assorted proteins. Blood cells come in three kinds: red, white, and platelets. Red blood cells are by far the most numerous; a single drop of blood contains millions. They carry oxygen away from the lungs, and contain an iron-based protein called hemoglobin that binds with oxygen and turns blood red. White blood cells fight infection, and platelets are cell fragments that help clot blood.

The heart pumps all this throughout the body using a closed circulatory system. Arteries carry blood away from the heart; veins bring it back. Tiny tubes called capillaries link those blood vessels to body tissues.



**Blood delivers oxygen and nutrients to cells, and it gives scientists an invaluable window into an animal's health.**

*"We consider our animals ambassadors of science. They contribute to research programs in the behavioral, environmental, and veterinary sciences. We don't have these animals simply for exhibition. We are a conservation and scientific organization."*

Then there are the invertebrates, creatures lacking a spinal column. Representing 99 percent of all known animal species, they include insects, arachnids, worms, clams, crabs, octopuses, sea stars, and many more. For many invertebrates, a fluid called hemolymph takes the place of blood.

Unlike vertebrate blood, hemolymph is not contained in a closed circulatory system. Instead, it fills the animal's body, bathing cells in sugars, proteins, and other nutrients. Some creatures use a substance called hemocyanin to carry oxygen where it's needed. The hemocyanin gives hemolymph a blue-green color. Most insects, in contrast, draw oxygen in through tiny holes in their bodies.

Some rare creatures have no blood or equivalent at all. Sponges, jellyfish, and some worms fall into this category. With no circulatory systems, their very porous bodies allow water to flow through easily. The constant water flow supplies food and oxygen while also removing waste.

### Ambassadors of Science

Keepers, veterinarians, and curators all constantly monitor the health of the Zoo's roughly 2,000 animals. Routine checkups, as well as exams of critters that appear under the weather, often include blood tests—thousands of them a year. After the blood is drawn, it goes to the clinical pathology lab at the veterinary hospital for analysis.

"We've probably tested the blood of all the mammals at the Zoo, except maybe some of the tiny ones," says medical technologist Stephanie Otto. The purpose of the testing is twofold: to establish a baseline of what's normal for each species and to identify anything that looks out of the ordinary for the veterinarians to investigate further.

"What is really normal for a species?" asks Betty Ackerman, another medical technologist with the lab. "We are really looking at gathering data. We maintain our own database which gives us normal ranges for different species." Ultimately, creating a species' baseline requires thousands of tests.

"We've provided a wealth of samples to standardize what are 'normal' parameters," says Tim Walsh, supervising veterinary pathologist. "We have a living collection here," he elaborates, "and we consider our animals ambassadors of science. They contribute to research programs in the behavioral, environmental, and veterinary sciences. We don't have these animals simply for exhibition. We are a conservation and scientific organization. We look at their blood as an investigative tool for understanding how the animal functions, how one species compares to another, and why these adaptations have occurred."

The Zoo has been freezing blood samples for 40 years. The serum bank, also called the cryopreservation bank, has some 15,000 samples. Since most zoos do not have an on-site pathology lab, the Zoo's lab also serves as a resource for other zoos and researchers.

### Wrangling the Hellbender

It's not only the Zoo's occupants whose blood gets studied. Researchers also venture into the field to collect the samples necessary for comparative data. Those field trips can be challenging.

Take, for example, the largest salamander in North America, the hellbender. This fascinating amphibian can grow two feet long and live up to 50 years. It has no gills, but breathes through skin resembling that of a shar-pei puppy, with multiple folds and wrinkles.

Self-described hellbender wrangler Kim Terrell heads up a three-year study looking at how temperature affects salamander health. Native to the fast-flowing, cold streams of Appalachia, the fully aquatic hellbenders may be even more at risk from climate change than their terrestrial cousins, because warm streams hold less oxygen than cold streams.

Traveling across Appalachia from Georgia to New York, Terrell and her team take blood samples from hellbenders in the wild to compare with blood drawn monthly from 18 animals in the salamander lab at the Reptile Discovery Center. "Most of the stuff we are measuring comes from the blood. It really tells us a lot," says Terrell.

## What's in a Name?

**The labels "warm-blooded" and "cold-blooded" are simple, familiar—and wrong.** They don't actually refer to temperature, and herpetologists generally avoid them.

"We use 'ectothermic' for 'cold-blooded' and 'endothermic' for 'warm-blooded,'" says Jim Murphy, curator of the Reptile Discovery Center. "Ectothermic reptiles and amphibians are basically getting their heat source not internally—like mammals—but externally."

Lizards and snakes warm themselves in the sun, then seek shade when it is time to cool down. These animals spend a lot of time regulating their body temperature. "For them to be at full speed," Murphy explains, "they try to get as close as they can to their optimum temperature. For some lizards, going even three degrees above it will kill them."

BRIAN GRATWICKE/NZP

MARK VAN BERGH

ABOVE: The work of the Zoo's new salamander lab entrances visitors young and old.
LEFT: The hellbender is North America's largest salamander.

"We chose this especially large species so we could draw blood without causing harm," explains Terrell. Regardless, a blood draw isn't easy. "They are slimy and wiggly. In the lab, the hellbenders are wrapped in a wet towel like a burrito. We hold them on the table upside down with their tail out. We take the blood from the underside of their tail. The veterinary technicians have gotten pretty good at it, and can do a draw in less than two minutes."

A key question Terrell and her team are exploring is the impact of climate change, which is causing temperatures to rise and could pose problems for animals adapted to a cooler habitat. "But at the same time," Terrell points out, "these animals can experience rapid, and potentially stressful, changes in weather patterns, which may or may not be related to climate change." This spring, her team saw 20-degree fluctuations from day to day in stream temperatures. What effect, they wondered, might this have on the hellbenders?

The team brought that question home to the Zoo. Seeking an answer, they replicated conditions from the wild in a tank holding nine hellbenders, where temperatures fluctuated from 60° to 80°F. As a control, another nine hellbenders dwelled in a tank with a steady temperature of 60°F.

Blood tests showed an increase in the immune function of the hellbenders in the first tank. The bottom line: Temperature fluctuations seem to increase the animals' bacteria-killing ability (BKA).

MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP

TOP: Medical technologist Stephanie Otto examines a blood sample. ABOVE: Studying blood is just one of many tasks for the Zoo's pathology lab. RIGHT: Powerful microscopes are vital tools for the Zoo's pathology team. FACING PAGE: Asian elephant Shanthi rests while veterinary technicians collect a blood sample from her ear.

## Liquid Gold

"Liquid gold" is how Janine Brown, a reproductive physiologist, describes blood serum. She directs the Zoo's endocrinology lab, in Front Royal. "Our diagnostic lab is like a fertility clinic for wildlife," she observes. Blood samples allow scientists there to diagnose pregnancies, determine whether or not females are cycling regularly, and even ascertain when an animal is ovulating—key to the success of artificial insemination.

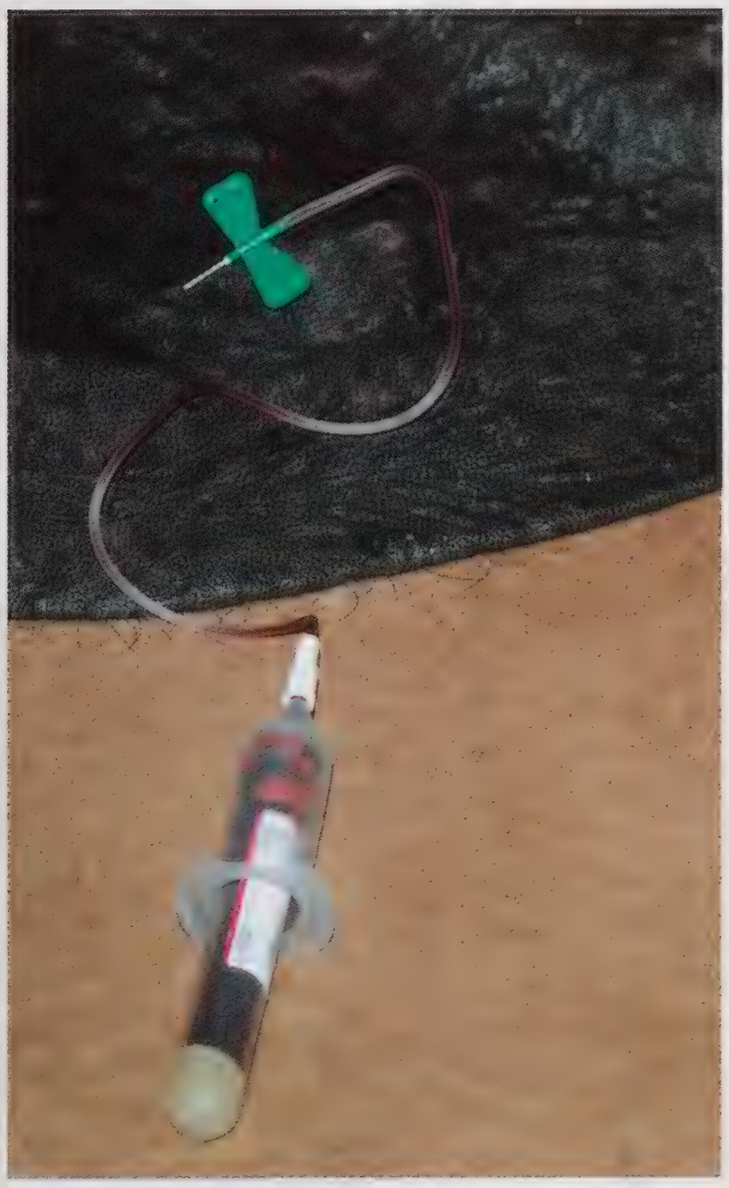
The Zoo's elephants have especially benefited from the lab's work. They have given blood samples since the late 1980s. "From a management and information standpoint, our elephants are the most studied in the world," says Brown.

Ambika, who arrived at the Zoo in 1961, is 65 or thereabouts. "About five years ago, she was passing blood and getting anemic," says Brown. "Examination of blood samples indicated that she had never gone through menopause. So we used an experimental vaccine to shut down the hormones that stimulate the uterus." Ambika no longer suffers from the cysts and tumors developed by older elephants who continue to cycle.

"We wouldn't have known where to look without the blood samples," notes Brown.

---

"By understanding the relationship between BKA and temperature, we can help predict if climate change will increase disease in wild hellbenders, and which populations would be most at risk. Identifying the threats facing wild salamanders is the first step to ensuring the survival of these remarkable species," Terrell writes in her blog, Salamander Science (**salamanderscience.com**).



MEHGAN MURPHY/NZP

"These findings can influence how we handle zoo and lab populations," Terrell says. "Maybe we should be changing the tank temperature every day to mimic the natural environment."

### Of Birds and Blood

Advances in studying blood chemistry have also furthered animal husbandry and reproductive physiology. One key development is that Zoo staff can now identify the sex of some birds even before they hatch.

"We've done it primarily with rhea eggs," says Sara Hallager, a biologist at the Bird House. Rheas are large, flightless birds native to South America. The Zoo's male rhea stands nearly six feet tall. The two females are between four and five feet.

The procedure begins with a process called candling, during which an egg is held before a light in a dark room. "You can see the developed embryo inside the egg," says Hallager. "You can see the veins." Warren Lynch, bird supervisor at the Front Royal campus, then drills a very small hole in the shell, directly above the vein. He inserts a tiny needle and extracts a drop of blood. The DNA in that one drop is all that's required to sex the bird.

That ability is an important tool for protecting the biodiversity of the gene pool. "We don't want an animal occupying a room at the inn of the Zoo that makes no contribution to preserving the viability of the species," says senior curator Ed Bronikowski. "Rheas have a mating strategy where one male mates with multiple females," says Hallager. "For a while, zoos stopped breeding rheas because no one could find homes for the extra males."

Sexing birds in the egg changes that scenario. Hallager explains, "The breeding season for rheas starts in January. I'll put out an email to AZA-accredited zoos asking if anyone wants a rhea. We hatch what we can place." This year, the Bird House has three female chicks destined for a zoo in New York. And three female eggs have already been sent to the Staten Island Zoo for hand-rearing.

### Needles and Treats

With all the blood flowing through the Zoo's labs, one might wonder about the challenges of collecting it. Animal care staff, ever mindful of their charges' well-being, work to minimize discomfort. Many animals only have their blood drawn when they are anesthetized. Sometimes serendipity comes to keepers' aid. Scratching a tapir's back with a rake, one employee discovered, will coax it to lie down for a blood draw.

Best of all, persistent and patient training has taught some animals to cooperate as their blood is drawn. Elephants stand still and extend their massive ears, allowing for quick collection of blood from easy-to-reach veins. Giant pandas and some orangutans, distracted and rewarded with treats, also submit voluntarily to blood draws.

"It is one of the things that still wows and astounds me," says associate veterinarian Katharine Hope, "the animals, keepers, and veterinarians all working together in such an amazing and peaceful way." So the next time you have a blood test, just close your eyes and think of Mei Xiang calmly extending her black, furry arm while a keeper slips her a steady stream of biscuits and pears. SZ

— VALERIE MAY *is a freelance writer and web producer.*

SMITHSONIAN zoogoer kids CORNER

# BEAST BITS

MEHGAN MURPHY/NZP

## Cool Costume

About a foot long, common leaf-tailed geckos could make tasty snacks for predators in their Madagascar habitat. But first, a predator would need to find a gecko. That's not easy, thanks to the gecko's camouflage. The reptile's tail looks just like a leaf. When the animal stays still, often hanging upside down on a tree, it appears to be part of the forest. ***You can visit a common leaf-tailed gecko at the Reptile Discovery Center.***

GIL MEYERS/NZP

South America's green anaconda is the world's largest snake. It can grow 29 feet long and weigh 550 pounds.

fun fact

## Fast Food

Rüppell's griffon vultures don't care if their food is fresh. In the wild, they feast on the rotting remains of dead animals. They can down several pounds of meat in just five minutes. Their strong stomachs even handle germs in the decaying flesh. Yucky as this menu may sound, vultures play an important role as nature's clean-up crew, removing carcasses that might otherwise pollute the landscape and spread disease. ***You can see Rüppell's griffon vultures at the Cheetah Conservation Station.***

# Courting Cranes

**Chris Crowe is aptly named. He's an animal keeper at the Zoo's Front Royal facility—the Smithsonian Conservation Biology Institute (SCBI)—and his special focus is birds. Not crows, though. He is primarily responsible for their taller and more colorful cousins: cranes.**

**Crowe spends his days caring for the animals at SCBI, including three species of cranes, loggerhead shrikes, and—occasionally—black-footed ferrets. Sometimes he observes an animal's behavior for clues to its health, well-being, and likeliness to reproduce. Other times, he tackles what looks like garden-variety yard work.**

"Basically, my job is to make sure the animals have everything they need to feel comfortable, and to breed successfully," Crowe explains. "There's a lot of observation and a lot of behavioral management. But there's also a lot of mowing and weeding. All with the idea of helping the animals breed successfully."

### Birds of a Feather

When Crowe arrived at SCBI nearly nine years ago, he already had some crane breeding experience at the U.S. Geological Survey's Patuxent Wildlife Research Center. Now, after nearly a decade working with SCBI's white-naped, red-crowned, and hooded cranes, he's become a full-fledged crane expert.

"It just sort of evolved naturally," Crowe recalls. "They're five feet tall; they're very impressive. And they're very sophisticated in their behavioral displays and vocalizations."

Those sophisticated displays can make it difficult for cranes to breed in zoos; the birds want everything to be just right, and won't breed otherwise. SCBI is renowned for breeding these birds, including cranes that haven't bred because of physical or behavioral issues. Last year, the SCBI crane team, including Crowe, won an award for their success breeding white-naped cranes.

A white-naped crane named Walnut is a perfect example. Walnut was hand-reared at another zoo, where she imprinted on humans. In her mind she is a human, which makes breeding difficult. When she was sent to SCBI in 2004 (the same year as Crowe), she was 24 years old and had never bred. Most cranes breed by the time they are three or four years old.

Crowe worked closely with Walnut, gaining her trust and training her to be comfortable around him. He did such an impressive job that Walnut considers Crowe her mate.

This trust allows Crowe to artificially inseminate Walnut without restraint, making the process less stressful—for Walnut and the animal care staff—and more productive. Walnut has produced six chicks so far. Since her imprinting means she wouldn't make a good crane mother, her chicks are hatched and raised by experienced pairs of crane foster parents also living at SCBI.

### A Wing and a Prayer

Crowe says that he's been interested in animals since he was a child, and wanted to help endangered animals since he was very young.

"I vividly remember visiting Yellowstone National Park when I was young and seeing the bison. I was horrified when I heard that they used to be in the millions, and we nearly wiped them out," Crowe recalls.

"That's the best part of my job: Being around such rare, endangered species, and trying to help them. Getting to be on their side."

— BRITTANY STEFF

CREATURE FEATURE

# Huge, Hairy HUNTER

BY WHITNEY JENCKS

**Itsy-bitsy spider? Not this critter. Meet the goliath bird-eating tarantula.**

## BIG Appetite

Arguably the largest spider on Earth, the goliath bird-eating tarantula grows more than 8 inches wide. That's about the size of a small pizza. The spider weighs 2.5 ounces. Its usual diet consists of frogs, small snakes, beetles, and lizards. The tarantula does eat young birds, but rarely. It lives in swamps and marshes in South America.

## A Strange Way of "SEEING"

Even with eight eyes, the goliath bird-eating tarantula doesn't see much. When it comes out of its burrow to hunt at night, it uses the hairs on its legs and abdomen to find prey. The hairs sense vibrations on the ground or in the air. That tells the spider something tasty may be moving nearby.

## POUNCE and Venom

Ever so quietly, the goliath bird-eating tarantula sneaks up on its unsuspecting prey. Then it pounces. Two fangs sink into the victim. They inject venom and digestive juices. The juices break up all the soft parts of the prey's body, turning them into liquid. The spider then slurps up its meal. Only bones, skin, fur, or feathers remain after this deadly dinner.

MEHGAN MURPHY/NZP

## Not Exactly LOVEBIRDS

The goliath bird-eating tarantula is aggressive and lives alone except when it is time to mate. Even then, a male must flee quickly to avoid being killed. The female later lays eggs in a silken sac. She takes the sac with her wherever she goes, and guards it ferociously until the spiderlings hatch.

## DON'T MESS With Me

Few creatures mess with these supersize spiders. Just in case, though, the tarantula has some hairy ways of defending itself. First it rubs hairs together. That makes a hissing noise loud enough to be heard 15 feet away. It can also let its hairs loose, flinging them at an attacker like arrows.

## TARANTULA Troubles

While not endangered, the goliath bird-eating tarantula has some trouble with one neighboring species—human beings. People destroy the spider's rainforest habitat. They also catch, roast, and eat tarantulas as a source of protein!

## At the ZOO

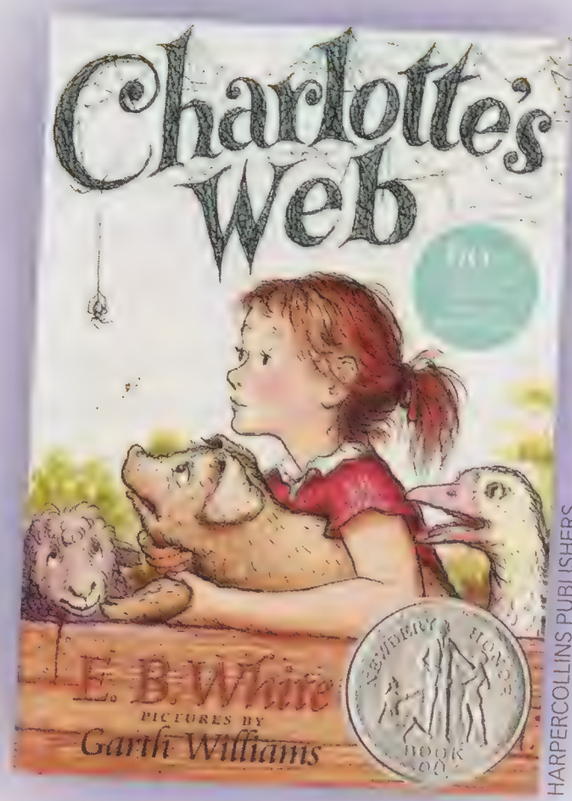
Creep on over to the Invertebrate Exhibit to learn more about this cool creature.

## YOUR TURN

## Beastly Books

The world's most famous spider is probably Charlotte, the star of E.B. White's classic tale, *Charlotte's Web*. He also wrote about a traveling mouse (*Stuart Little*) and a lovelorn swan (*The Trumpet of the Swan*).

If you were to write a book about an animal, which creature would you choose and why? Let us know at **zoogoer@si.edu.**

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## FONZ RESOURCES

fonz.org

Member/Donor Information
202.633.2922

Special Events
202.633.4470

Corporate Events
202.633.3045

Camps and Classes
202.633.3024

Volunteer Services
202.633.3025

Comments? Questions?
Please email us at
fonzmember@si.edu

Not a FONZ member yet?
Call 202.633.2922
or go to
fonz.org/join

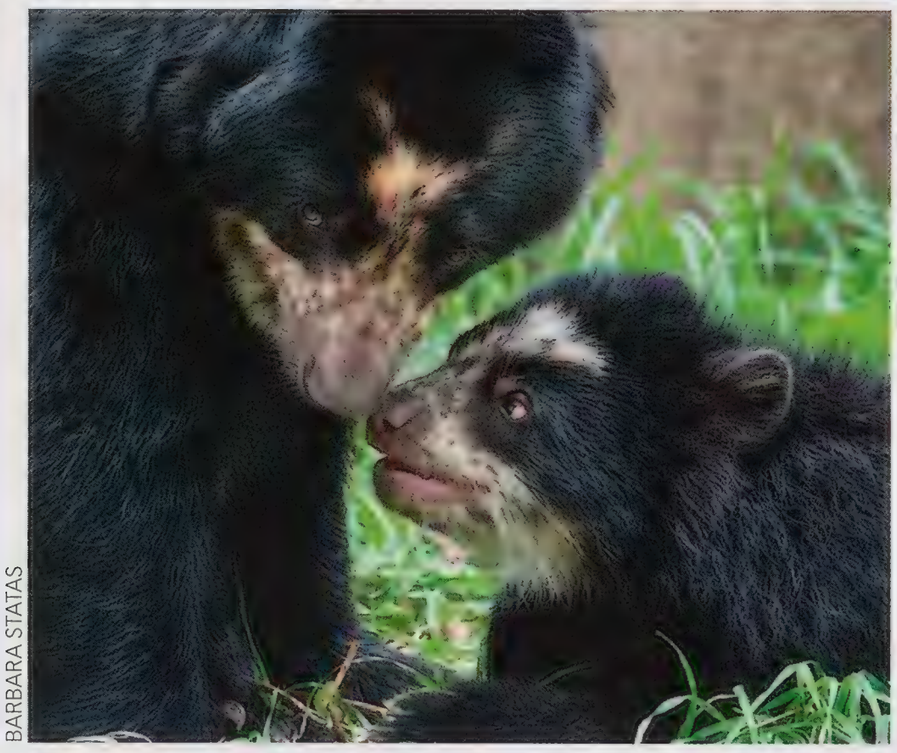
## FALL FESTIVITIES

### Rock-N-Roar

September 6

Get ready to rock with an acoustic performance by Marc Roberge and Richard On of O.A.R. **fonz.org/rocknroar**

MEHGAN MURPHY/NZP



BARBARA STATAS

### Fiesta Musical

September 29

Celebrate Hispanic Heritage Month at the Zoo's Fiesta. **fonz.org/fiesta**

MEHGAN MURPHY/NZP

### Boo at the Zoo

October 25-27

Join us at the Zoo for Halloween treats, games, and fun for the whole family. **fonz.org/boo**

### Autumn Conservation Festival

October 5-6

Come explore the Zoo's Front Royal conservation research station during this once-a-year opportunity. **fonz.org/acf**

MARK VAN BERGH

### Night of the Living Zoo

October 30

Join us for our adult Halloween event, if you dare. **fonz.org/nolz**

MEHGAN MURPHY/NZP

## PLEASE VOTE.
## FONZ Board Election

New nominees and three current board members are on the ballot for election to the Friends of the National Zoo board of directors. In accordance with FONZ bylaws, each nominee is a FONZ member, was nominated by a dues-paying FONZ member, and has been carefully reviewed by the board's nominating committee.

We now invite you to review each candidate's biographical information before casting your vote at **fonz.org/ballot.** If you prefer a hard copy of the ballot, please call 202.633.4379. Voting begins mid-September. The last day to vote is October 16, 2013.

We also want to thank our outgoing board members—Audit Committee Chair David Harrison, Thor Cheston, and Anne Salladin—for their service. FONZ is grateful for all the time and effort they have devoted toward advancing the missions of FONZ and the Smithsonian's National Zoo.

## YOU'RE INVITED!
## FONZ Annual Meeting
### October 24, 6 to 8 p.m.

Meet your board and mingle with your fellow Friends of the National Zoo members at the 55th FONZ Annual Meeting in the Zoo's Visitor Center auditorium. Events will kick off at 6 p.m. with light refreshments, followed by updates on FONZ and Zoo accomplishments and plans, as well as the introduction of newly-elected officers and members of the FONZ board of directors.

RSVP at **fonz.org/annualmeeting**.


# Join us for a typical day in the country.

# A country filled with wicked cool endangered animals, that is.

Come to the Autumn Conservation Festival for an unforgettable day in the foothills of the Blue Ridge Mountains. But it is not just any old day in the country when you add the opportunity to meet scientists and learn about wildlife conservation. You'll get it all at the Smithsonian National Zoo's Autumn Conservation Festival—the one weekend of the year when the Smithsonian Conservation Biology Institute in Front Royal, Virginia, is open to the public. Come on out and join the fun. It is anything but ordinary.

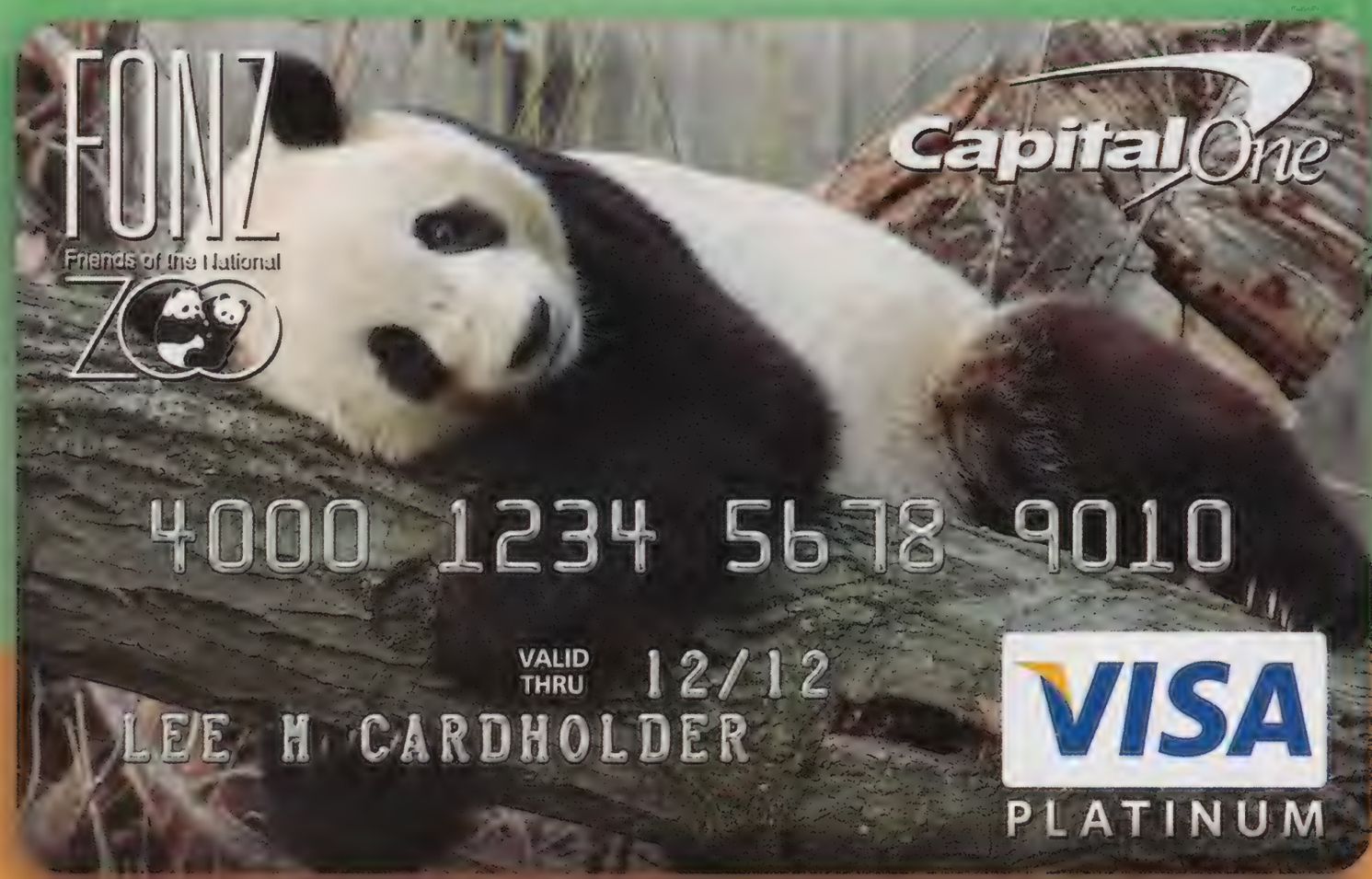
Car passes required for admission. One day passes are free to FONZ SCBI Club members; $30 otherwise. Maximum of six people per car and pass. Each additional person is $5. Get your pass today at www.fonz.org/acf.htm.

Smithsonian's National Zoo
AUTUMN CONSERVATION FESTIVAL

October 5-6, 2013
10 a.m.–3 p.m.
Smithsonian Conservation Biology Institute
Front Royal, Virginia

# SAVE ANIMALS, EARN REWARDS

SHOW YOUR SUPPORT FOR **FONZ** AND EARN 1.25 MILES FOR EVERY $1 SPENT




FONZ Friends of the National ZOO

Capital One

Friends of the National Zoo (FONZ) has partnered with Capital One® to offer you three credit card options to fit your needs. Choose a card that earns you great rewards, one with a low introductory APR or another to help build your credit. Plus, you can choose an image for your card that highlights your support for FONZ. Apply today!

**www.fonz.org/visa**

Credit approval required. Terms and conditions apply. Offered by Capital One, N.A.. © 2011 Capital One

## Learn at the Zoo!

**FONZ programs offer children and adults the opportunity to gain a deeper understanding of animals, their behaviors, habitats, and more. From zoo-related crafts (for the young ones) to meetings with our world-class keeper staff (for the grown-up but young-at-heart), FONZ educational programs are sure to excite and inspire.**

**Please note that programs do not include behind-the-scenes visits or direct contact with animals. All programs meet in the Visitor Center unless otherwise noted.**

Use the FONZ Member Discount Code **SLOTHBEAR2013** to receive your member rate on children's and adult classes for the remainder of 2013!

Learn more, get updates on the class schedule, and register online: **fonz.org/classes**

### PRESCHOOL CLASSES

**Ages 2-3**

Parents and children are invited to discover the Zoo together with our preschool classes. All children must be accompanied by an adult. For everyone's safety, unregistered children (including siblings) may not attend, with the exception of infants who do not yet crawl.

### CHILDREN'S CLASSES

**Ages 4-9**

Children ages 4-9 explore the Zoo and learn about its animals through our FONZ children's classes. Parents are not required or encouraged to stay with the class, but may if they wish (no additional charge).

MEHGAN MURPHY/NZP

### ADULT CLASSES

**18 and older**

The National Zoo is not just for kids! Whether you want to spice up your résumé or just pursue an interest in wildlife, adult classes at the Zoo provide an insider's look at animal behavior, conservation, and ecology. Classes may be used toward the completion of the Wildlife Studies Certificate Program.

MARK VAN BERGH

### GROUP PROGRAMS AT THE ZOO

**How Do You Zoo? (New!)**

It's sure to be a ZOO-per time in How Do You Zoo?! FONZ staff will help your children ages 5-10 explore Zoo careers in this interactive play space. Kids will test their skills by completing tasks in four pretend settings within the exhibit: doing research in the Small Mammal House, becoming an animal chef, examining animal x-rays, and taking care of business as a Smithsonian's National Zoo keeper. Children who pass their training will be certified as Junior Zoo Staff (each child will receive a participation patch)!

Group program. Minimum ten children per program. One adult chaperone for every five children is required. $18 per child. Chaperones are free.

Contact Callie Noyes at **NoyesC@si.edu** to schedule your reservation. We require three weeks notice to reserve How Do You Zoo?

JANICE SVEDA

### PARTY AT THE ZOO

Make your child's next birthday party a truly wild event! Your child and your child's friends, equipped with safari hats and expert tour guides, will explore the Zoo for an unforgettable time. Birthday parties are two hours long and are for children ages 4-8. Please note that parties do not include behind-the-scenes visits or direct contact between children and animals.

Birthday parties are a member-only offering!

We are still accepting registrations for 2013 parties. **Priority registration (Premier members only) for 2014 birthday parties begins October 29, 2013. Registration for all members begins November 5, 2013.**

Learn more and register online: **fonz.org/birthdayparty**

ABBY WOOD/NZP

# Mama's Boy

**Hank, a sloth bear cub born on December 19, 2012, made his Asia Trail debut on June 20. Photographer Abby Wood was there to greet him.**

"Like most young cubs, Hank follows his mom pretty much everywhere she goes in the yard right now," Wood explains. By noting which way his mother, Hana, was heading, Wood found a good spot to stand. "I got right up to the glass and snapped this photo as he looked my way."

**Technical Notes —**
CAMERA: Nikon D800; EXPOSURE: 1/250 sec at f/5.6;
FOCAL LENGTH: 200 mm; ISO: 800

***Smithsonian Zoogoer*** welcomes FONZ members' submissions of photos taken at the Zoo. Please send photos to **Zoogoer@si.edu**. We will contact you if we are able to use your picture for the Zoo View page.

***Join the Club!***
Membership in the FONZ Photo Club is open to photographers of all skill levels. The group meets monthly to hear guest speakers and to share and discuss members' work. Learn more at **fonz.org/photoclub.htm.**

A Halloween event for adults.

# NIGHT OF THE LIVING ZOO

**JOIN US IF YOU DARE.** October 30, 2013

Sponsored by The Coca-Cola Company, DC101, Samuel Adams, and Washington City Paper | **fonz.org/NOLZ**

FONZ
Friends of the National Zoo

**Friends of the National Zoo,** PO Box 37012, MRC 5516, NW, Washington, DC 20013-7012, **www.fonz.org**

Smithsonian
*National Zoological Park*

***Thank you for being a FONZ member.***
Your membership supports animal care, science, conservation, and more.